

REDACTED

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WISCONSIN

U.S. Water Services, Inc., and
Roy Johnson

Plaintiffs,

v.

Novozymes A/S, and
Novozymes North America, Inc.,

Defendants.

Case No. 13-cv-864-bbc

Expert Report of Richard F. Bero, CPA, CVA
April 1, 2015

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TABLE OF CONTENTS

I.	Introduction.....	1
A.	Assignment	1
B.	Basis for opinions	1
C.	Trial.....	2
D.	Basic damages assumptions.....	3
E.	Summary of opinions.....	4
F.	Expert experience and compensation.....	4
II.	Parties in the lawsuit	5
A.	Plaintiff	5
1.	U.S. Water.....	5
2.	Roy Johnson.....	5
B.	Defendant – Novozymes.....	5
1.	Novozymes A/S	6
2.	Novozymes North America, Inc.	6
III.	The Patented Technology – deposit control technology to reduce fouling in ethanol plants.....	6
A.	Overview of dry grind ethanol process	7
B.	How Ethanol Plants Addressed Fouling Prior to pHytOUT	8
IV.	U.S. Water’s Patented Product - pHytOUT	9
A.	pHytOUT pounds, sales, ASP and profit.....	9
B.	pHytOUT plants and customers.....	10
C.	pHytOUT supply agreements	11
D.	Benefits of pHytOUT.....	11
V.	Novozymes’ Phytase Products - Phytaflow	12

HIGHLY CONFIDENTIAL

A.	Phytaflow pounds, sales, ASP and profit.....	13
B.	Phytaflow's lower pricing.....	14
C.	Novozymes identified similar Phytaflow benefits.....	15
D.	Phytaflow appears to be sold with Novozyme's sales of [REDACTED].....	17
VI.	Damages opinions and basis	19
A.	Overview of patent damages.....	19
B.	Hypothetical negotiation – approximately April 9, 2013	20
C.	The royalty base – Phytaflow pounds	21
D.	Royalty rate – quantitative considerations	21
1.	Income approach – range of approximately \$10.00 to \$5.00 per pound.....	22
a)	[REDACTED]	22
b)	[REDACTED] [REDACTED]	24
c)	[REDACTED] [REDACTED]	26
d)	Phytaflow profit per unit – more than [REDACTED] per pound.....	27
2.	[REDACTED]	27
3.	Cost Approach – no apparent guidance	29
E.	Starting point royalty rate range - \$5.00 to \$10.00 per pound.....	29
F.	<i>Georgia-Pacific</i> Factors.....	29
1.	Factor #1: The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty. <u>Upward effect.</u>	29
2.	Factor #2: The rates paid by the licensee for the use of other patents comparable to the patent in suit. <u>No effect.</u>	30
3.	Factor #3: The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of	

HIGHLY CONFIDENTIAL

	territory or with respect to whom the manufactured product may be sold. <u>Neutral effect</u>	30
4.	Factor #4: The licensor's established policy and marketing program to maintain its patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly. <u>Upward effect</u>	30
5.	Factor #5: The commercial relationship between the licensor and the licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter. <u>Upward effect</u>	31
6.	Factor #6: The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of its non-patented items; and the extent of such derivative or convoyed sales. <u>Upward effect</u>	31
7.	Factor #7: The duration of the patent and the term of the license. <u>Neutral effect</u>	33
8.	Factor #8: The established profitability of the product made under the patent; its commercial success; and its current popularity. <u>Neutral effect</u>	33
9.	Factor #9: The utility and advantage of the patent property over the old modes or devices, if any, that had been used for working out similar results. <u>Upward effect</u>	34
10.	Factor #10: The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention. <u>Upward effect</u>	34
11.	Factor #11: The extent to which the infringer has made use of the invention and any evidence probative of the value of that use. <u>Neutral effect</u>	35
12.	Factor #12: The portion of the profit or selling price that may be customary in the particular business or in comparable businesses for the use of the invention or analogous inventions. <u>No effect</u>	35
13.	Factor #13: The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer. <u>Higher end of range</u>	35

HIGHLY CONFIDENTIAL

14.	Factors #14 & #15: The opinion and testimony of qualified experts, and the amount that a licensor (such as the patentee) and licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is the amount a prudent licensee – who desires as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention – would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a licensee.....	36
G.	Opinion: A reasonable royalty is \$8.00 per pound, and royalty damages approximate [REDACTED] million through December 31, 2014.	37
VII.	Conclusion	39

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I. Introduction

A. Assignment

I have been asked to analyze and provide expert opinions on damages issues on behalf of the Plaintiffs in relation to *U.S. Water Services, Inc. and Roy Johnson v. Novozymes A/S and Novozymes North America, Inc.*, Case No. 13-cv-864-bbc.

U.S. Water Services, Inc. and Roy Johnson (collectively, “U.S. Water”) have alleged that Novozymes A/S and Novozymes North America, Inc. (collectively, “Novozymes”) infringe United States Patent No. 8,415,137 (the “’137 patent”), issued on April 9, 2013, titled “Preventing Phytate Salt Deposition in Polar Solvent Systems” and/or United States Patent No. 8,609,399 (the “’399 patent”), issued on December 17, 2013, titled “Reducing Insoluble Deposit Formation in Ethanol Production” (collectively, “the U.S. Water patents” or “the Patents-in-Suit”).¹

I have not formed any opinions about the infringement, validity or enforceability of the Patents-in-Suit or any legal opinions relating to the other aspects of this matter. However, for the purposes of my analysis, I assume that Novozymes has infringed the Patents-in-Suit. Further, I assume that by making, selling, and offering to sell phytase enzymes under the brand name Phytaflow or bearing the product number 50161 (collectively, “Phytaflow”) to various ethanol plants, with the express purpose of encouraging, aiding and/or causing such plants to utilize the methods within the scope of the U.S. Water patents, Novozymes indirectly infringes through inducement and/or contributory infringement.² My opinions and bases are addressed in detail throughout my report and attached schedules.

B. Basis for opinions

My opinions are based upon analysis and consideration of the following:

- the Complaint, other legal filings and related exhibits, including the ’137 patent and the ’399 patent;
- documents produced/provided by the parties in this litigation;
- deposition testimony and related deposition exhibits;

¹ First Am. Compl.

² First Am. Compl. 6-7. *See also*, Expert Report of Eric Dorn Regarding Infringement 2, 4.

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- expert reports;
- discussions with the following U.S. Water personnel:
 - Al Bly, CEO
 - Todd Emslander, Director of Sales of Ethanol Process Technologies (“EPT”)
 - Roy Johnson, Chief Innovation Officer and one of the inventors of the Patents-In-Suit
 - Monty McCoy, Director of Technology
 - Rachel Nelson, Senior Financial Analyst
 - Dennis Pasko, Vice President of EPT
- discussions with U.S. Water’s technical expert:
 - Eric Dorn, Principal of Dorn Consulting, LLC
- tour of the United Wisconsin Grain Producers, LLP (“UWGP”) ethanol plant in Friesland, Wisconsin;
- independent research; and
- my skills, knowledge, professional background, education and work experience.

A detailed list of data and other information I have considered at this time in developing my opinions is included as **Attachment 1**. In the event that additional relevant information becomes available after the issuance of my Report, I will incorporate such information as necessary.

C. Trial

In preparing for trial, I may prepare demonstrative exhibits based upon information included in this Report or additional information that becomes available hereafter.

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D. Basic damages assumptions

With regard to all of my damages analyses and opinion, I assume that the parties' reported revenue, cost and units data is generally accurate and reliable.³ I also am instructed to make the additional primary assumptions as follows:

- The '137 and '399 patents are valid and enforceable.
- A hypothetical negotiation to determine a reasonable royalty between U.S. Water and Novozymes would have taken place on approximately April 9, 2013.⁴
- The damages period begins April 9, 2013.⁵
- All Phytaflow sales to customers set forth in **Schedule 1.0** (*i.e.*, ethanol plants with reduced pressure/vacuum or atmospheric distillation) beginning April 9, 2013 infringe the '137 patent and are subject to damages.⁶
- All Phytaflow sales to customers set forth in **Schedule 1.0** (*i.e.*, ethanol plants with reduced pressure/vacuum or atmospheric distillation) beginning December 17, 2013 infringe the claims of the '399 patent reciting a limitation relating to the pH of the ethanol processing fluid in the beer column being 4.5 or higher and are subject to damages.⁷

³ I have summarized Phytaflow sales, costs and profits based on NZ-USW00026289, however, NZ-USW00028731 is an additional document produced which appears to be a forecast of Phytaflow sales. To the extent that additional information becomes available with regards to NZ-USW00028731, I shall incorporate that into my report.

⁴ Alternatively, if the '137 patent is found to not infringe, the hypothetical negotiation for the '399 patent would be approximately December 17, 2013, the date of issuance of the '399 patent, and the royalty considerations and rate would have reasonably been the same, as discussed at the end of my report.

⁵ Alternatively, if the '137 patent is found to not be infringed, I have calculated damages starting December 17, 2013, the date of issuance of the '399 patent. *See* **Schedule 1.0**.

⁶ I am instructed that, if any the asserted claims of the '137 patent are found to be valid and infringed, then the royalty base includes the customer plants and Phytaflow pounds set forth in **Schedule 1.1**. The asserted claims of the '137 patent are claims 1, 6, 12 and 13.

⁷ I am instructed that, if any the following asserted claims of the '399 patent are found to be valid and infringed, then the royalty base includes the customer plants and Phytaflow pounds set forth in **Schedule 1.2**. The asserted claims in this group are claims 2, 16-22 and 35. I am instructed that sales that infringe these claims also will infringe claims 1, 5-12, 25, 28-32, and 34 of the '399 patent.

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- All Phytaflow sales to customers set forth in **Schedule 1.0** (*i.e.*, ethanol plants with reduced pressure/vacuum, atmospheric or pressure distillation) beginning December 17, 2013 infringe the claims of the '399 patent not reciting a limitation relating to the pH of the ethanol processing fluid in the beer column being 4.5 or higher and are subject to damages.⁸

E. Summary of opinions

It is my opinion that in a hypothetical negotiation between U.S. Water and Novozymes on approximately April 9, 2013 for the Patented Technology, the parties would have agreed to a reasonable royalty of \$8 per pound of Phytaflow sold. Based on the [REDACTED] of Phytaflow sold from April 9, 2013 through December 31, 2014, the reasonable royalty damages approximate [REDACTED].⁹ In the event that only the '399 patent is found to be infringed, it is my opinion that in a later hypothetical negotiation on approximately December 17, 2013, the parties would have similarly agreed to a reasonable royalty rate of \$8 per pound of Phytaflow sold, and based on at least [REDACTED] of Phytaflow sold from December 17, 2013 through December 31, 2014, the reasonable royalty damages approximate [REDACTED].¹⁰

F. Expert experience and compensation

I am a certified public accountant accredited in business valuation, a certified valuation analyst and the Managing Director of The BERO Group.¹¹ I have analyzed economic damages and accounting and financial issues in a variety of litigation matters concerning areas such as patent infringement, trademark infringement, copyright infringement, trade secrets, breach of contract, dealership disputes and construction disputes. I have testified as an expert more than 125 times. My curriculum vitae, including a list of my testimonial experience in the last four years and publications in the last ten years, is included as **Attachment 2**.

Compensation to The BERO Group for professional services provided in preparing this report is based on our customary hourly fees. My hourly rate is \$485 while the rates for my staff range from \$160-\$350. The BERO Group has no financial interest in the outcome of this litigation.

⁸ I am instructed that, if any the following asserted claims of the '399 patent are found to be valid and infringed, then the royalty base includes the customer plants and Phytaflow pounds set forth in **Schedule 1.3**. The asserted claims in this group are 1, 5-12, 25, 28-32, and 34.

⁹ **Schedule 1.0.**

¹⁰ **Schedule 1.0.**

¹¹ The BERO Group was formerly a division of Corporate Financial Advisors, LLC, a firm I co-founded in 1995.

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II. Parties in the lawsuit

A. Plaintiff

1. U.S. Water

U.S. Water is a Minnesota corporation with its principal place of business in Michael, Minnesota.¹² U.S. Water offers innovative technologies to ethanol manufactures to help improve their efficiency and profitability.¹³ Roy Johnson is an employee of U.S. Water.¹⁴

In mid-2009, U.S. Water introduced its pHytOUT product, a phytase product for reducing formation of insoluble deposits of phytic acid in fuel ethanol-processing equipment in fuel ethanol plants.¹⁵

2. Roy Johnson

Roy Johnson is currently the Chief Innovation Officer for U.S. Water.¹⁶ Roy Johnson is also listed as one of the inventors of both the '137 patent and the '399 patent.¹⁷

B. Defendant – Novozymes

[REDACTED], Novozymes introduced its Phytaflow product [REDACTED]

[REDACTED]

[REDACTED].¹⁸

¹² Compl. ¶ 1.

¹³ Compl. ¶ 1.

¹⁴ Compl. ¶ 2.

¹⁵ Per 'Phytase sales 3.17.15.xlsx.' Per discussions with counsel and Eric Dorn, I understand that the pHytOUT product itself is not patented, but rather is used in the methods of the "Patented Technology" as discussed below. For simplicity, I refer to pHytOUT V, pHytOUT XP, pHytOUT FG, USWS 2500 and USWS 2400 products herein as "pHytOUT."

¹⁶ Deposition of Roy Johnson 6.

¹⁷ '137 and '399 patent.

¹⁸ Per NZ-USW00026289_HIGHLY_CONFIDENTIAL.xlsx. *See also*, Expert Report of Eric Dorn Regarding Infringement 4.

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1. Novozymes A/S

Novozyymes A/S is a Danish corporation with its principal place of business in Bagsvaerd, Denmark.¹⁹ Novozymes A/S is a global company that sells industrial enzymes, microorganisms and biopharmaceutical ingredients.²⁰

2. Novozymes North America, Inc.

Novozyymes North America, Inc. is a New York corporation with its principal place of business in Franklinton, North Carolina.²¹ Novozymes North America, Inc. appears to be a subsidiary of Novozymes A/S.²²

III. The Patented Technology – deposit control technology to reduce fouling in ethanol plants

The '137 patent is titled "Preventing Phytate Salt Deposition in Polar Solvent Systems." It issued on April 9, 2013.²³ The '399 Patent is titled "Reducing Insoluble Deposit Formation in Ethanol Production" and it issued on December 17, 2013.²⁴ I understand that the '399 patent is a continuation of the '137 patent, appears to share a common specification and the benefits of both are the same.²⁵ I refer to both patents, collectively, as "the Patented Technology." I understand that the Patented Technology generally relates to methods for deposit control to reduce fouling in fuel ethanol plants.

Eric Dorn, technical expert for U.S Water stated:²⁶

These patents generally relate to **reducing the formation of insoluble deposits of phytic acid and salts of phytic acid in fuel ethanol-processing equipment in fuel ethanol plants.** [emphasis added]

¹⁹ Compl. ¶ 3.

²⁰ Compl. ¶ 3.

²¹ Compl. ¶ 4.

²² Compl. ¶ 4.

²³ '137 patent, Col 1. 50 – 53.

²⁴ '399 patent.

²⁵ The '137 and '399 patents. *See also*, Expert Report of Eric Dorn Regarding Infringement 4.

²⁶ Expert Report of Eric Dorn Regarding Infringement 4.

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I understand that deposit formation or “fouling” of equipment was a long-recognized problem in the ethanol industry.²⁷ Typically, the areas of the plant that experience fouling are the heat exchangers, the beer column and the evaporators.²⁸ I understand that different plants have different points of fouling, though one especially problematic area has been the beer mash heat exchanger.²⁹

When fouling occurs in a heat exchanger, I further understand that deposits that include phytic acid and phytic acid salts form on heated surface areas, which reduce heat exchanger efficiency, reduce flow rates and increase pressure.³⁰

I understand that the distinguishing advantages of the Patented Technology over other alternatives, such as the addition of sulfuric acid, are that fuel ethanol plants are able to reduce deposit formation, fouling rate and severity, reduce sulfuric acid usage, operate areas of the plant at higher pH levels, increase energy savings from the more efficient heat transfer and also potentially increase ethanol yields.³¹

I am not a technical expert and do not intend to provide opinions relative to the technical aspects of the Patented Technology. For purposes of my report, I assume Novozymes has infringed the Patented Technology. Further, to the extent that one or both patents are found to be infringed, the damages analysis would be the same.³²

A. Overview of dry grind ethanol process

Fuel ethanol plants typically operate by converting starchy grains such as corn, wheat or milo (sorghum) into ethanol by utilizing yeast to ferment the available parts of those materials into ethanol.³³

A dry grind plant begins the process by milling the grain to produce a “meal.”³⁴ The meal is then mixed with water and “backset” in a “slurry” tank.³⁵ The slurry “mash” is then sent to a

²⁷ Expert Report of Eric Dorn Regarding Infringement 11.

²⁸ Expert Report of Eric Dorn Regarding Infringement 11.

²⁹ Discussion with Eric Dorn.

³⁰ Discussion with Eric Dorn.

³¹ Discussion with Eric Dorn. [REDACTED]

³² While the damages analysis would be the same, the damages period, and the pounds subject to damages, would be adjusted accordingly. *See* **Schedule 1.0**.

³³ Expert Report of Eric Dorn Regarding Infringement 8.

³⁴ Expert Report of Eric Dorn Regarding Infringement 8.

³⁵ Expert Report of Eric Dorn Regarding Infringement 8.

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“liquefaction” tank to provide residence time for enzymatic reactions.³⁶ The heated mash from the liquefaction system is then generally cooled by passing it through a beer-mash heat exchanger on its way to the fermentation system.³⁷ I understand that pHytOUT is typically added to the process in [REDACTED].³⁸

In the fermentation system, yeast is added either directly or through use of a propagator tank to heated mash from the liquefaction tank.³⁹ When the fermentation is complete, the material, now typically termed “beer,” is transferred to the “beer well” and then to the distillation system after generally passing through the, same as previously discussed, beer-mash heat exchanger.⁴⁰

The first stage of the distillation system is the “beer column” where the ethanol separation process begins.⁴¹ In the beer column, ethanol and water vapor is separated from the remainder of the beer, referred to as “whole stillage.”⁴²

Whole stillage is then typically separated into two stream; “wet cake” and “thin stillage.”⁴³ Wet cake contains high fiber and solids content and is processed into animal feed.⁴⁴ Thin stillage is either recycled back as “backset” or else passed through evaporators where water is removed to create “syrrup” which is combined with wet cake to make animal feed.⁴⁵

B. How Ethanol Plants Addressed Fouling Prior to pHytOUT

According to Eric Dorn, until the time of the invention, deposits were handled in one of two ways: (1) hydroblasting or cleaning in place (“CIP”) with sulfamic acid or caustic, or (2) lowering the pH of the “beer”, typically through the addition of sulfuric acid, thereby reducing the deposits, the potential deposits and/or the rate of deposit formation.⁴⁶ For plants that use phytase, the cost savings from the reduction of sulfuric acid are an easy benefit to quantify.⁴⁷

³⁶ Expert Report of Eric Dorn Regarding Infringement 9.

³⁷ Expert Report of Eric Dorn Regarding Infringement 9.

³⁸ Discussion with Eric Dorn; discussion with Roy Johnson; *see also*, Expert Report of Eric Dorn Regarding Infringement 21-52.

³⁹ Expert Report of Eric Dorn Regarding Infringement 9.

⁴⁰ Expert Report of Eric Dorn Regarding Infringement 9-10.

⁴¹ Expert Report of Eric Dorn Regarding Infringement 10.

⁴² Expert Report of Eric Dorn Regarding Infringement 10.

⁴³ Expert Report of Eric Dorn Regarding Infringement 10.

⁴⁴ Expert Report of Eric Dorn Regarding Infringement 10.

⁴⁵ Expert Report of Eric Dorn Regarding Infringement 10.

⁴⁶ Expert Report of Eric Dorn Regarding Infringement 11.

⁴⁷ Discussion with Roy Johnson and Eric Dorn.

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IV. U.S. Water's Patented Product - pHytOUT

U.S. Water first introduced its pHytOUT product in mid-2009 as pHytOUT V (or "V"), [REDACTED].⁴⁸ Subsequent to Novozymes entering the market [REDACTED], U.S. Water introduced pHytOUT XP ("XP") and U.S. Water 2500 ("2500") [REDACTED].⁴⁹ I refer to pHytOUT V, XP and 2500 (and other minor pHytOUT products) collectively as "pHytOUT."

A. pHytOUT pounds, sales, ASP and profit

Table 1 below summarizes pHytOUT V, XP, 2500 and other pHytOUT annual pounds, sales dollars, gross profits and gross profit % rates:⁵⁰

Table 1: pHytOUT pounds, sales dollars and gross profit %

⁴⁸ Discussion with Dennis Pasko.

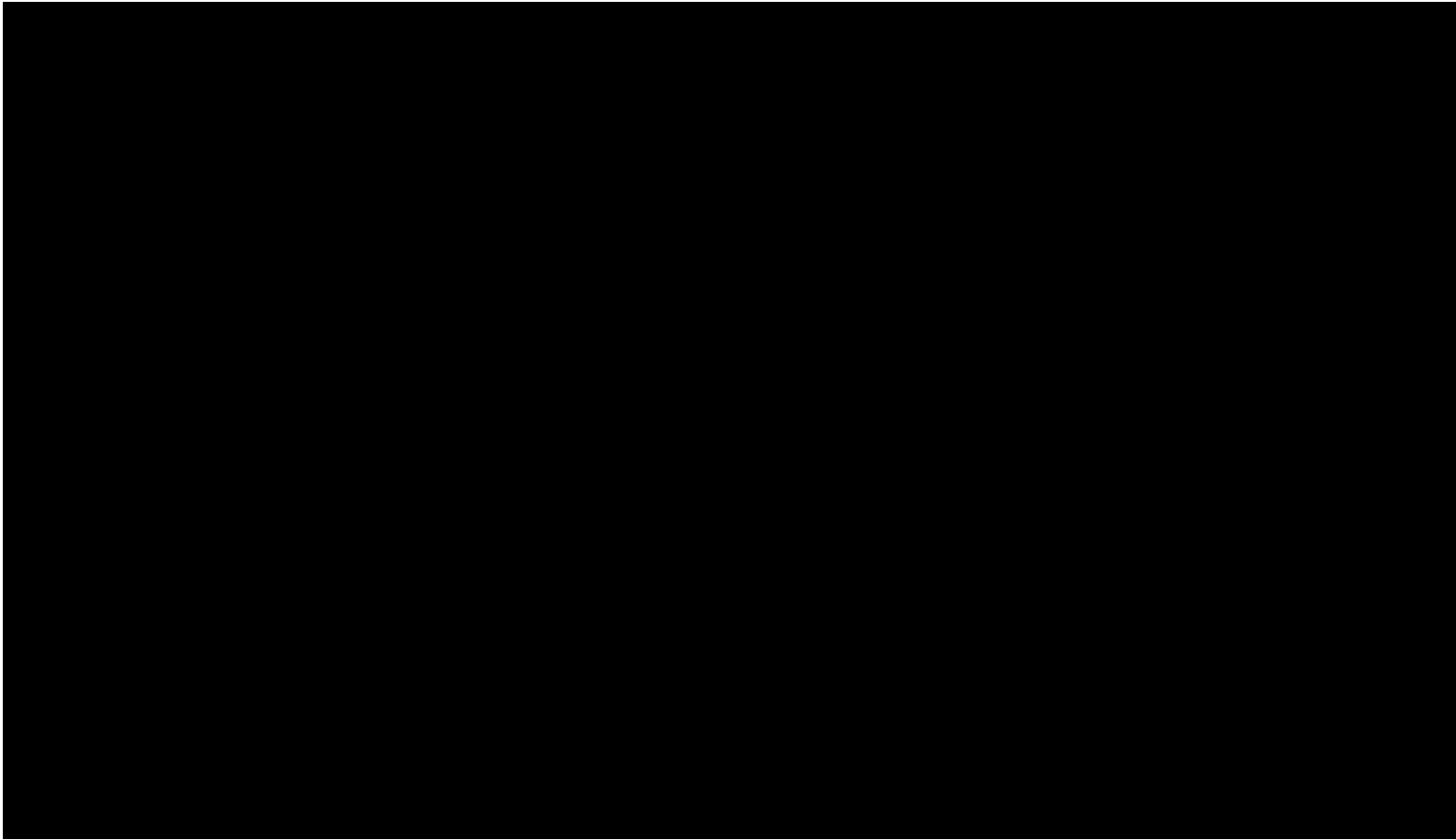
⁴⁹ [REDACTED]

⁵⁰ Schedule 6.4.

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Table 2 below summarizes pHytOUT V, XP, 2500 and other pHytOUT average sales price (ASP) / per pound, cost of goods sold / per pound and gross profit / per pound.⁵¹

Table 2: pHytOUT ASP, cost of goods sold and gross profit per pound



B. pHytOUT plants and customers

As previously discussed, pHytOUT is currently sold for use in dry grind fuel ethanol plants.⁵² I understand that there are approximately 224 dry grind fuel ethanol plants in North America and that [REDACTED]

[REDACTED]
[REDACTED]

⁵¹ **Schedule 6.4.**

⁵² Discussion with Dennis Pasko.

⁵³ Discussion with Dennis Pasko.

⁵⁴ Discussion with Dennis Pasko.

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■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

V. Novozymes' Phytase Products - Phytaslow

Novozymes has sold, offered for sale and is selling phytase products for use in practicing the Patented Technology.⁶⁴ The Novozymes products that are involved in the accused infringement include:⁶⁵

- Novozym 50161 ("50161")
- Phytaslow

I refer to the Novozyme products involved in the accused infringement, collectively, as "Phytaslow." [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]⁶⁷ According to Eric Dorn, technical expert for U.S. Water, Novozymes Phytaslow was developed and marketed for the same purpose as the Patented Technology.⁶⁸

Further, it appears that Novozymes specifically targeted its Phytaslow to replace pHytOUT. For example:

⁶⁴ Discussions with counsel.

⁶⁵ Discussion with counsel. Novozymes also sells a product called "Novozym 50226" which includes phytase. This amount equates to less than 0.5% of the infringing pounds.

⁶⁶ NZ-USW00026294. *See also*, Letter to Lissa Koop, dated 09/15/2014 from Ewa Davison.

⁶⁷ NZ-USW00026375.

⁶⁸ Expert Report of Eric Dorn regarding Infringement 4.

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- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

A. Phytaflow pounds, sales, ASP and profit

Novozymes has provided product information showing its Phytaflow pounds, sales, ASP and profit.⁷⁷ **Table 3** below summarizes annual pounds, sales dollars, average sales price (ASP) / per pound, average incremental costs / per pound, and incremental profit / per pound for Novozyme's Phytaflow.⁷⁸

⁶⁹ NZ-USW00003923 - NZ-USW00003931 at NZ-USW00003928.

⁷⁰ NZ-USW00026489 - NZ-USW00026491 at NZ-USW00026490.

⁷¹ NZ-USW00026489 - NZ-USW00026491 at NZ-USW00026490.

⁷² NZ-USW00026489 - NZ-USW00026491 at NZ-USW00026489.

⁷³ NZ-USW00026487 - NZ-USW00026488 at NZ-USW00026487.

⁷⁴ NZ-USW00027954 - NZ-USW00027956 at NZ-USW00027955.

⁷⁵ NZ-USW00026792.

⁷⁶ NZ-USW00000106 - NZ-USW00000126 at NZ-USW00000118.

⁷⁷ Per NZ-USW00026289_HIGHLY_CONFIDENTIAL.xlsx. Note that the Phytaflow data was provided in kilograms, and are converted to pounds throughout to be consistent with the U.S. Water data that is expressed in lbs.


⁷⁸ Schedule 5.0.










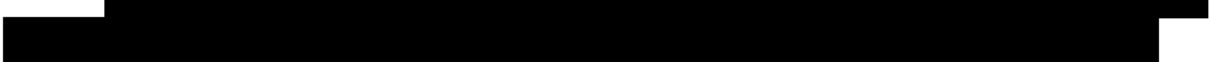
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Table 3: Novozymes' pounds, sales dollars, ASPs and profit per pound

A large rectangular area of the document is completely redacted with a solid black box, obscuring the data from Table 3.

B. Phytaflow's lower pricing

Novozymes has competed with U.S. Water in part by offering Phytaflow at lower prices than U.S. Water's pHytOUT.⁷⁹ 

⁷⁹ Schedules 5.0 and 6.0. Discussions with Dennis Pasko.

⁸⁰ Schedule 5.0.

⁸¹ Schedule 5.0.

⁸² Schedule 6.0.

⁸³ Discussion with Dennis Pasko.

⁸⁴ Discussion with Dennis Pasko.

⁸⁵ Discussion with Dennis Pasko.

⁸⁶ Deposition of Michael Chisam 39-40.

⁸⁷ Deposition of Michael Chisam 40-41.

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[REDACTED].

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

C. Novozymes identified similar Phytaflow benefits

In August 2013, shortly after the issuance of the '137 patent, Novozymes promoted Phytaflow on its website.⁹⁰ When describing Phytaflow, Novozymes' website stated:⁹¹

Novozymes Phytaflow – Ensuring smoother plant operations

...

The effects of fouling can cost ethanol plants time and money. Fouling reduces the efficiency of heat exchangers, which increases the natural gas usage, and can cause downtime in production. Fouling also can require additional sulfuric acid and/or hydroblasting.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁸⁸ Deposition of Michael Chisam, Exhibit 8. *See also*, KANSASETH000736.

⁸⁹ Deposition of Lyle Schyler 117.

⁹⁰ <http://www.novozymes.com/en/solutions/bioenergy/starch-based-ethanol/viscosity-reduction/Phytaflow/Pages/default.aspx>. This appears to be the earliest website capture available and the one closest to the hypothetical negotiation.

⁹¹ <https://web.archive.org/web/20130829121000/http://novozymes.com/en/solutions/bioenergy/starch-based-ethanol/viscosity-reduction/Phytaflow/Pages/default.aspx>.

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- [REDACTED]
[REDACTED]

- [REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

A benefit sheet posted in June 2014 expanded on the description of Phytaflow and stated:⁹³

Phytaflow is a phytase applied in fermentation that directly reduces backend fouling to ensure smoother plant operations. With Phytaflow, reduced fouling provides your plant the benefit of chemical and energy savings all while retaining flexibility to control and optimize enzyme dose.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁹² NZ-USW00026374.

⁹³ <https://web.archive.org/web/20140612181634/http://novozymes.com/en/solutions/bioenergy/starch-based-ethanol/viscosity-reduction/Phytaflow/Documents/2013-06976-01-Phytaflow.pdf>.

⁹⁴ NZ-USW00000208 - NZ-USW00000209.

⁹⁵ NZ-USW00000209.

⁹⁶ NZ-USW00000209.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

D. Phytaflow appears to be sold with Novozyme's sales of [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁹⁷ NZ-USW00000209.

⁹⁸ [REDACTED]

⁹⁹ Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S. Water Services, Inc. at 35.

¹⁰⁰ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁰¹ Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S. Water Services, Inc. at 36. *See, e.g.*, Rogers Dep. Ex. 38 at NZ-USW00007207; Fowler Dep. Ex. 12 at NZ-USW00003004-05.

¹⁰² Expert Report of Eric Dorn Regarding Infringement 67. *See also*, Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S. Water Services, Inc. at 35 - 40.

¹⁰³ Expert Report of Eric Dorn Regarding Infringement 67. *See also*, Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S. Water Services, Inc. at 35 - 40.

¹⁰⁴ NZ-USW00026826 - NZ-USW00026827 at NZ-USW00026826.

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[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]

- [REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

- [REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

¹⁰⁵ NZ-USW00027555 - NZ-USW00027565 at NZ-USW00027558.

¹⁰⁶ NZ-USW00003004 - NZ-USW00003006 at NZ-USW00003004.

¹⁰⁷ NZ-USW00027995 - NZ-USW00027996 at NZ-USW00027995.

- 19

HIGHLY CONFIDENTIAL

The value of what was taken measures the reasonable royalty. The Federal Circuit has stated:¹¹³

As a substantive matter, it is the “value of what was taken” that measures a “reasonable royalty” under 35 U.S.C. § 284.
[emphasis added]

In determining the reasonable royalty, I address relevant royalty considerations within the context of the fifteen factors set forth in the case *Georgia-Pacific Corp. v. The United States Plywood Corp.* (the *Georgia-Pacific* Factors).¹¹⁴ Specifically, *Georgia-Pacific* Factor #15 relates to the development of a reasonable royalty based on a hypothetical negotiation between a willing licensor (U.S. Water) and a willing licensee (Novozymes) just before the infringement began.¹¹⁵

B. Hypothetical negotiation – approximately April 9, 2013

The hypothetical negotiation presumes that both parties assume that the patent is valid and infringed.¹¹⁶ While the hypothetical negotiation takes place at or just before the infringement, the Federal Circuit has stated the negotiation “*permits and often requires a court to look at events that occurred thereafter and that could not have been known to or predicted by the hypothesized negotiators,*”¹¹⁷ and, in certain situations, “*factual developments occurring after the date of the hypothetical negotiation can inform the damages calculation.*”¹¹⁸ This is often referred to as the “*Book of Wisdom.*”¹¹⁹

In this matter, I address the hypothetical negotiation between U.S. Water and Novozymes. I assume the hypothetical negotiation would have taken place in April 2013 (April 9, 2013, is the date of issuance of the first patent) for the Patented Technology. At that time, Novozymes had been selling its Phytaflow for over a year.¹²⁰

¹¹³ *Ericsson, Inc., v. D-Link Systems, Inc.* (Fed. Cir. 2014) (J. O’Malley) (citing *Dowagiac Mfg. Co. v. Minn. Moline Plow Co.*, 235 U.S. 641, 648 (1915)).

¹¹⁴ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

¹¹⁵ *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009).

¹¹⁶ *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1325 (Fed. Cir. 2009).

¹¹⁷ *Fromson v. Western Litho Plate & Supp. Co.*, 853 F.2d 1568, 1575 (Fed. Cir. 1988).

¹¹⁸ *Lucent*, 580 F.3d 1301 at 1333-34.

¹¹⁹ *Lucent*, 580 F.3d 1301 at 1333-34.

¹²⁰ **Schedule 5.0.**

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C. The royalty base – Phytaflow pounds¹²¹

License agreements and royalty amounts can be expressed in various forms. Lump sum royalty amounts and running royalties are the two primary forms of royalties. Lump sum royalty amounts are a single, lump sum dollar amount. Running royalties can be expressed in various forms such as a percentage of sales or as an amount per unit. Running royalty amounts are typically determined by starting with a royalty base and multiplying the royalty base by a royalty rate.

The entire market value rule addresses the royalty base and considers whether the sales price of the entire product (as opposed to the sales price of a portion of the product, for example) should be the royalty base upon which a royalty rate percentage is applied. The entire market value rule is described as follows:

The entire market value rule allows for the recovery of damages based on the value of an entire apparatus containing several features when the feature patented constitutes the basis for customer demand.¹²²

The pHytOUT and Phytaflow products are specifically distinguishable products from other types of products because they are standalone phytase products specifically sold and used for deposit control and reduction of fouling. The Patented Technology reasonably represents the basis for customer demand. While the entire market value rule applies, I address royalty damages in this matter in the form of a running royalty rate per pound applied to the Phytaflow pounds subject to damages.

D. Royalty rate – quantitative considerations

As noted above, I address the hypothetical negotiation considerations in the negotiation between U.S. Water and Novozymes. I address the determination of a reasonable royalty within the construct of the 15 *Georgia-Pacific* Factors. A determination of a reasonable royalty considers both quantitative and qualitative elements as well. The *Georgia-Pacific* Factors themselves are generally comprised of either quantitative or qualitative considerations.

My analysis first addresses quantitative royalty rates, and then addresses the qualitative analysis relative to those quantitative amounts. Quantitative analysis is based upon basic

¹²¹ **Schedule 1.0** outlines various infringement scenarios and Phytaflow pounds.

¹²² *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51 (Fed. Cir. 2012), quoting *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1336 (Fed. Cir. 2009).

HIGHLY CONFIDENTIAL

valuation theory comprised of three categories of valuation approaches referred to as: (1) income, (2) market, and (3) cost. The income valuation approach considers the amount of expected profit that is attributable to the invention and/or the increased profits derived from the invention. The market valuation approach considers comparable licenses and royalty rates. The cost valuation approach typically considers the cost to design around the invention. As explained below, the income approach is the most relevant here, while the market approach provides additional guidance.

1. Income approach – range of approximately \$10.00 to \$5.00 per pound

a) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Phytaflo had already replaced pHyTOUT at multiple ethanol plants such as:¹²⁵

[REDACTED]

¹²³ Schedule 6.0.

¹²⁴ Schedules 6.0 and 7.2.

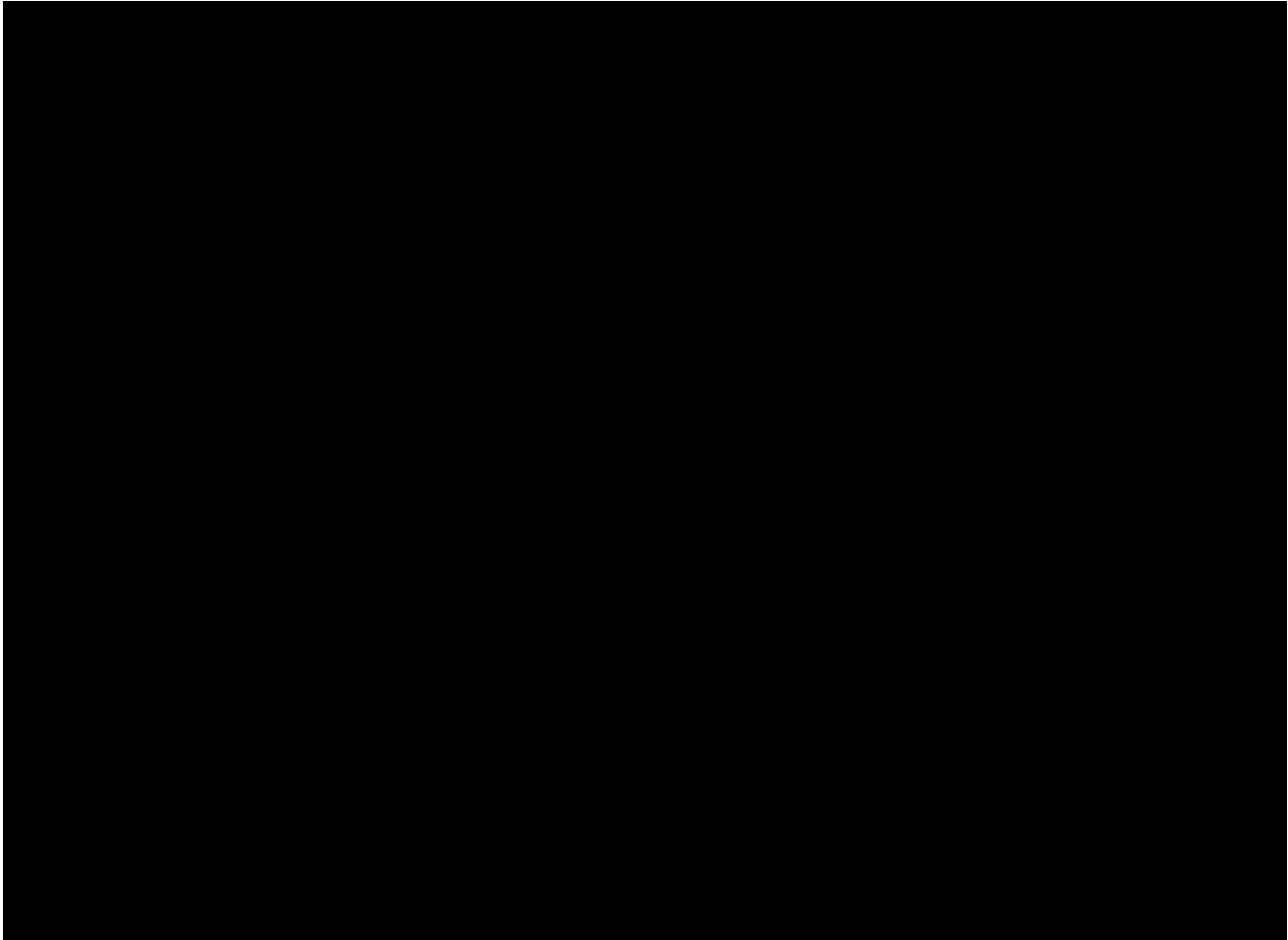
¹²⁵ Schedule 10.1. [REDACTED]

[REDACTED] See Schedule 10.0.

HIGHLY CONFIDENTIAL

[REDACTED]
[REDACTED]¹²⁶

Chart 1: pHytOUT and Phytaflow pounds: 2009 through 2012



In addition, U.S. Water has relationships with and/or experience with many of the ethanol plants in the U.S.¹²⁷ [REDACTED]

[REDACTED]

¹²⁶ **Schedule 9.0.**

¹²⁷ Discussion with Dennis Pasko, Todd Emslander and Roy Johnson.

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¹²⁸ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

b) [REDACTED]
[REDACTED]

U.S. Water had developed the market for the Patented Technology that provides the reduced fouling and other benefits in dry grind ethanol plants. It had priced its products accordingly. Novozymes did not. [REDACTED]

[REDACTED]
[REDACTED]
¹³¹ [REDACTED]

Phytaflow was introduced [REDACTED]

¹³² [REDACTED] In 2012 Phytaflow average price was [REDACTED]
[REDACTED]
¹³³ [REDACTED]

As can be seen in **Chart 2** below, in 2012, with Phytaflow in the market, [REDACTED]

[REDACTED]
¹³⁴ [REDACTED]

¹²⁸ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

¹²⁹ **Schedule 5.4.** Calculated by adding up Valero plants and dividing by the total post-issuance pounds.

¹³⁰ **Schedule 6.0.**

¹³¹ **Schedules 6.0 and 9.0.**

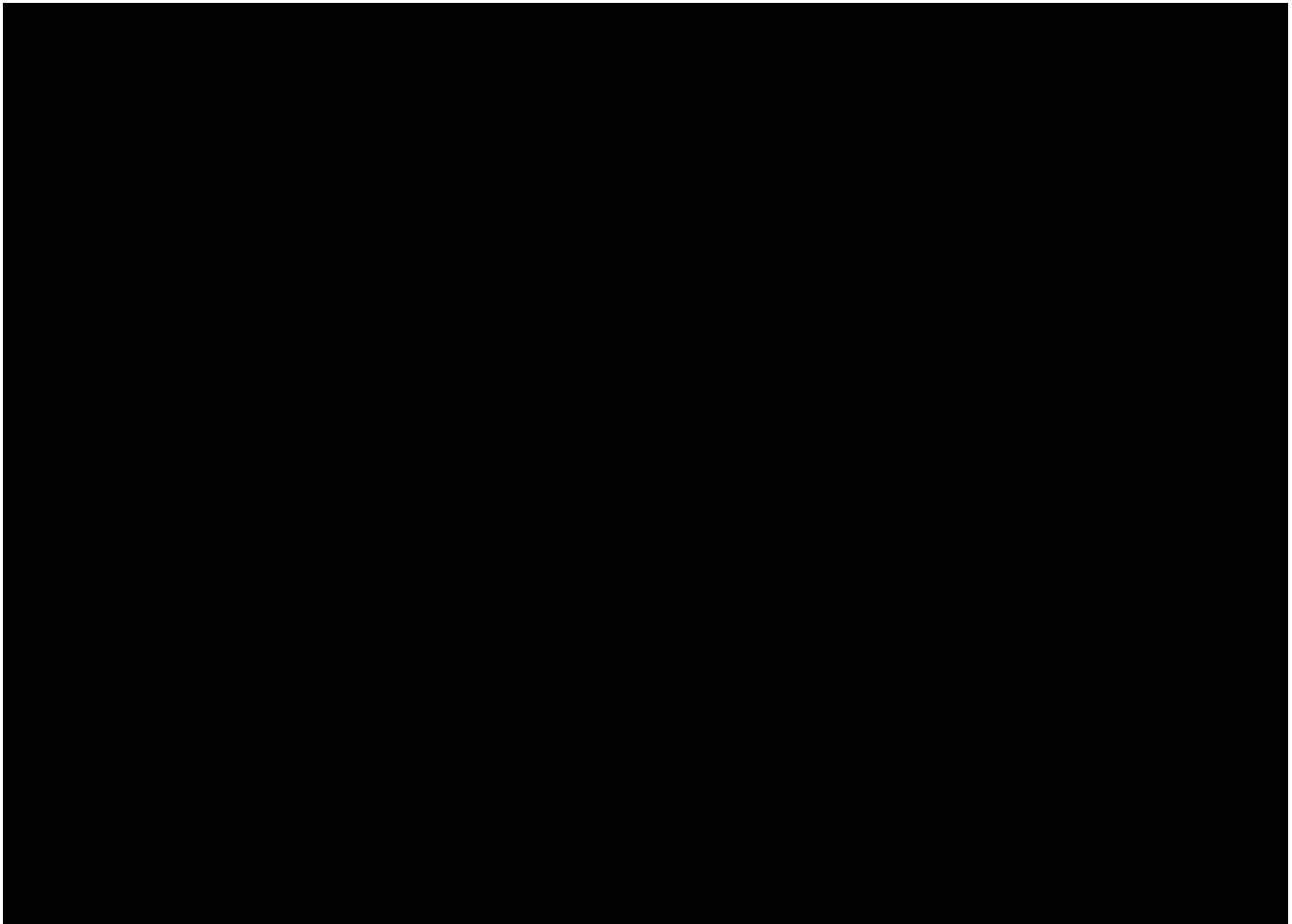
¹³² **Schedule 6.0.**

¹³³ **Schedule 5.0.** [REDACTED]

[REDACTED]
¹³⁴ **Schedule 6.0.**

HIGHLY CONFIDENTIAL

Chart 2: pHyTOUT and Phytaflow pounds: 2009 through 2014



In early 2013, prior to the issuance of the '137 patent on April 9, [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].¹³⁶

After the market entrance of the [REDACTED]

[REDACTED].¹³⁷

Novozymes' ongoing price undercutting was an ongoing concern to U.S. Water, both before and after the April 2013 hypothetical negotiation.¹³⁸ Subsequent to the issuance of the '137 patent, Novozymes sold its accused Phytaflow at prices below [REDACTED] per pound whereas [REDACTED]

¹³⁵ Schedule 6.0.

¹³⁶ Schedule 6.3.

¹³⁷ Schedules 3.0 and 6.4.

¹³⁸ Discussion with Roy Johnson, Dennis Pasko and Todd Emslander.

HIGHLY CONFIDENTIAL

[REDACTED].¹³⁹ During this time, U.S. Water's pHytOUT product mix continued to shift from its original, [REDACTED]

[REDACTED].¹⁴⁰

[REDACTED].¹⁴¹ Novozymes' average Phytaflow selling price was [REDACTED] per pound, [REDACTED]

[REDACTED].¹⁴² In other words, with its Patented Technology, [REDACTED]
[REDACTED] Novozymes allegedly infringing Phytaflow. Accounting for U.S. Water's 2013 additional incremental costs (*i.e.*, sales costs) [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].¹⁴⁴

c)

pHytOUT is part of U.S. Water's EPT, or Ethanol Process Technologies division. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].¹⁴⁶

[REDACTED]
[REDACTED]

¹³⁹ Schedules 5.0 and 6.0.

¹⁴⁰ Schedule 6.4.

¹⁴¹ Schedule 3.0.

¹⁴² Schedule 3.0.

¹⁴³ Schedule 3.0.

¹⁴⁴ [REDACTED]

¹⁴⁵ Schedule 7.1.

¹⁴⁶ Schedule 4.0.

¹⁴⁷ Schedule 7.1.

HIGHLY CONFIDENTIAL

149

d) **Phytaflow profit per unit – more than** [REDACTED]

As of the hypothetical negotiation, with its lower prices, Novozymes was earning [REDACTED] in incremental profit on its Phytaflow.¹⁵⁰ Novozymes would have recognized that without the hypothetical license for the Patented Technology, it would not have been able to earn these profits. This profit amount provides evidence of Novozymes' view of the lost value from not licensing the Patented Technology.

2. Market Approach – U.S. Water supply agreements [REDACTED]

I understand that there are no naked license agreements for the Patented Technology.¹⁵¹ Rather, U.S. Water has licensed the Patented Technology in conjunction with supply agreements it has entered into with various customers.¹⁵² [REDACTED]

¹⁴⁸ **Schedule 4.1.**

¹⁴⁹ **Schedule 2.0.**

¹⁵⁰ **Schedule 5.0.**

¹⁵¹ Discussions with Dennis Pasko and Roy Johnson.

¹⁵² **Schedule 8.0.**

¹⁵³ *See, e.g.*, USW-N00049963 – 00049974.

¹⁵⁴ **Schedule 8.0.**

HIGHLY CONFIDENTIAL

pHytOUT price as of early 2013.¹⁶⁴ These supply agreements suggest an **upward effect on the \$10.00 per pound high end of the starting point royalty rate range.**

Similarly, the supply agreements suggest an **upward effect on the \$5.00 per pound low end of the starting point royalty rate range** that is derived from two of the four income approach analyses (both of which are derived, in part, from the lower [REDACTED] Phytaflow selling price in early 2013).¹⁶⁵

2. Factor #2: The rates paid by the licensee for the use of other patents comparable to the patent in suit. No effect.

This is a potential market valuation factor. I am not aware of any comparable license agreements where Novozymes is the licensee. This factor has **no effect** on the starting point royalty rate range.

3. Factor #3: The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold. Neutral effect.

The license would have been a non-exclusive, non-restricted license between U.S. Water and Novozymes in the United States. Generally speaking, the non-exclusive nature of the license would tend to have a downward effect on a royalty rate, while the non-restricted nature would tend to have an upward effect on a royalty rate. The supply agreements were all non-exclusive agreements.

Relative to the starting point royalty rate range, a non-exclusive, non-restricted license would tend to have a **neutral effect** on the starting point royalty rate range.

4. Factor #4: The licensor's established policy and marketing program to maintain its patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly. Upward effect.

U.S. Water has licensed the Patented Technology directly to its customers in its supply agreements as noted above. Other than licensing to its customers, I understand that U.S. Water has not licensed the Patented Technology or other U.S. Water patents.¹⁶⁶ U.S. Water would have

¹⁶⁴ Schedules 6.0 and 8.0.

¹⁶⁵ Schedule 5.0.

¹⁶⁶ Discussion with Roy Johnson.

HIGHLY CONFIDENTIAL

been reluctant to license its principal competitor, particularly given the fact that Novozymes had targeted U.S. Water's customers and sold its competing Phytaflow at lower prices. This factor has an **upward effect** within the starting point royalty rate range.

5. Factor #5: The commercial relationship between the licensor and the licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter. Upward effect.

A competitive relationship tends to suggest an upward effect on a royalty rate. As discussed above, U.S. Water and Novozymes are effectively the only competitors in the phytase market for deposit reduction. Novozymes launched Phytaflow to specifically target and replace U.S. Water's pHytOUT. In doing so, it undercut Phytaflow prices by a significant amount. At the time of the hypothetical negotiation, pHytOUT prices had already been reduced due to Phytaflow competition, and Phytaflow had caused [REDACTED]. In early 2013, Phytaflow's [REDACTED] per pound average selling price [REDACTED] than pHytOUT's already affected [REDACTED] per pound average selling price.¹⁶⁷

At the time of the hypothetical negotiation, both U.S. Water and Novozymes would recognize that for every licensed Phytaflow sale that Novozymes would make under the license, that sale would represent a likely sale that U.S. Water would otherwise make.

Relative to the starting point royalty rate range, this factor tends to suggest an **upward effect.**

6. Factor #6: The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of its non-patented items; and the extent of such derivative or convoked sales. Upward effect.

As noted above, [REDACTED] launched in 2012.¹⁶⁸ [REDACTED].¹⁶⁹ Accordingly, I understand that [REDACTED] customers apparently have used a standalone phytase product [REDACTED]

¹⁶⁷ Schedules 5.0 and 6.0.

¹⁶⁸ Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S. Water Services, Inc. at 35.

¹⁶⁹ Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S. Water Services, Inc. at 35; Fowler Dep. 160-161.

HIGHLY CONFIDENTIAL

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] and Phytaflow appear to go hand in hand and Novozymes has adopted the use of Phytaflow as “best practice” for customers using [REDACTED].¹⁷² Novozymes apparently has bundled its products, allowing it to sell its products at a lower price, incentivizing customers to buy more than one product from Novozymes.¹⁷³ Sales and profits of a product such as [REDACTED] would have presented an opportunity for Novozymes to factor [REDACTED] sales and pricing into the lower pricing of Phytaflow. I understand that Novozymes has not produced its [REDACTED] sales, costs, profits or customers. In the event such information is produced, I reserve the right to supplement my analyses and opinions as necessary.

U.S. Water also sells other EPT products to its customers, such as VOxOUT, ProHib and ProClean. I understand that ProHib and ProClean are often sold to customers who also purchase pHyTOUT, and that when pHyTOUT customers are lost, these other products sales are often lost.¹⁷⁴

Relative to the starting point royalty rate range, this factor tends to suggest an **upward effect** on the starting point royalty rate range.

¹⁷⁰ NZ-USW00027555 - NZ-USW00027565 at NZ-USW00027558.

¹⁷¹ NZ-USW00003004 - NZ-USW00003006 at NZ-USW00003004.

¹⁷² See Rogers Dep. Exhibits 22 and 38.

¹⁷³ See, for example, NZ-USW00027544.

¹⁷⁴ Discussion with Roy Johnson. Discussion with Dennis Pasko and Todd Emslander. [REDACTED]. Schedule 7.0 shows sales and profits of these various U.S. Water EPT products.

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7. Factor #7: The duration of the patent and the term of the license.
Neutral effect.

As noted above, the '137 patent issued on April 9, 2013. I understand that the patent will expire on approximately October 17, 2027.¹⁷⁵ As further noted above, the '399 patent issued on December 17, 2013. I understand that the patent also will expire on approximately October 17, 2027.¹⁷⁶ At the time of the hypothetical negotiation, the '137 patent would have had approximately 14.5 years remaining and the '399 patent would have had approximately 13.75 years remaining, respectively.

My experience suggests that a longer license tends to suggest a slight upward effect on a royalty rate. Relative to the starting point royalty rate range, this factor tends to suggest a **neutral effect** on the starting point royalty rate range.

8. Factor #8: The established profitability of the product made under the patent; its commercial success; and its current popularity.
Neutral effect.

The income approach as described above captures the product's profitability, while also capturing its commercial success and current popularity.

The profitability of the pHytOUT and Phytaflow products are captured in the starting point royalty rate range. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁷⁷ Since then, the volume has grown through 2014.¹⁷⁸

Relative to the starting point royalty rate range, this factor would have a **neutral effect** on a royalty rate.

¹⁷⁵ Discussion with counsel.

¹⁷⁶ Discussion with counsel.

¹⁷⁷ **Schedule 9.0.**

¹⁷⁸ **Schedule 9.0.**

HIGHLY CONFIDENTIAL

9. Factor #9: The utility and advantage of the patent property over the old modes or devices, if any, that had been used for working out similar results. Upward effect.

Factors #9 and # 10 both relate to the advantages due to the use of the Patented Technology and the related benefits to the user of the technology over alternative means of achieving similar results. As discussed throughout my report, the Patented Technology provides numerous benefits including deposit control and reduces deposit formation, fouling rate and severity, reduces sulfuric acid usage, increases energy savings from more efficient heat transfer and potentially increases ethanol yields.

Both Novozymes and U.S. Water documents address the pHytOUT and Phytaflow advantages as addressed throughout. The U.S. Water supply agreements contained partial return on investment calculations and demonstrated customer values typically in multiples of the typical [REDACTED] price to those customers.¹⁷⁹ [REDACTED]

[REDACTED]¹⁸⁰

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] or Novozymes [REDACTED]
[REDACTED] in early 2013), that do not fully capture the pricing originally derived from the Patented Technology. Therefore, this factor would tend to have an upward effect on a royalty rate.

10. Factor #10: The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention. Upward effect.

Similar to Factor #9 above, prior to the sales of the allegedly infringing Phytaflow, U.S. Water sold its pHytOUT at higher prices. [REDACTED]

¹⁷⁹ Schedule 8.0.

¹⁸⁰ [REDACTED]
[REDACTED] See NZ-USW00000059.

11. Factor #11: The extent to which the infringer has made use of the invention and any evidence probative of the value of that use. Neutral effect.

12. Factor #12: The portion of the profit or selling price that may be customary in the particular business or in comparable businesses for the use of the invention or analogous inventions. No effect.

13. Factor #13: The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer. Higher end of range.

¹⁸² Lyle Schlyer Dep. Ex. 13.

HIGHLY CONFIDENTIAL

[REDACTED]

This suggests a royalty rate toward the higher end of the starting point royalty rate range.

- 14. Factors #14 & #15: The opinion and testimony of qualified experts, and the amount that a licensor (such as the patentee) and licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is the amount a prudent licensee – who desires as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention – would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a licensee.**

At the time of the hypothetical negotiation in April 2013, the parties would have reasonably been aware of the following considerations:

¹⁸³ Schedule 5.0.

¹⁸⁴ Schedule 2.0.

HIGHLY CONFIDENTIAL

- [REDACTED]
- [REDACTED]
- Prior to the Phytaflow competition, the benefits to customers supported a market price of pHytOUT of approximately [REDACTED] per pound
- U. S. Water had already reduced its pHytOUT prices from approximately [REDACTED] per pound in 2011 to [REDACTED]
- U.S. Water was earning more than [REDACTED] per pound on pHytOUT
- Novozymes U.S. Water was earning more than [REDACTED] in premium over its other EPT products
- Novozymes was earning more than [REDACTED] on Phytaflow

The \$5.00 to \$10.00 per pound starting point royalty rate range captures some of these considerations. Numerous *Georgia-Pacific* Factors addressed above suggest an upward effect within this range. The direct competition between the licensor and licensee combined with Novozymes' undercutting the pHytOUT prices suggests an upward effect within the range. In particular, Factor #13 highlights the portion of profit attributable (i.e. the amount that should be apportioned) to the patented technology as opposed to profit that is attributable to other non-patented elements, manufacturing, risks, sales and distribution and other contributions. It suggests a value of more than \$8.00 per pound.

G. Opinion: A reasonable royalty is \$8.00 per pound, and royalty damages approximate [REDACTED] through December 31, 2014.¹⁸⁵

It is my opinion that a reasonable royalty rate is \$8.00 per pound. I note that this rate is higher than Novozymes' [REDACTED].¹⁸⁶ However, I also note it was Novozymes' decision to undercut U.S. Water's pricing. I recognize that the Federal Circuit has stated:¹⁸⁷

The infringer's selling price can be raised if necessary to accommodate a higher royalty rate, and indeed, requiring the infringer to do so may be the only way to adequately compensate the patentee for the use of its technology.

¹⁸⁵ Schedule 1.0.

¹⁸⁶ Schedule 5.0.

¹⁸⁷ *Douglas Dynamics, LLC v. Buyers Prods. Co.*, 717 F.3d 1336, 1346 (Fed. Cir., 2013).

HIGHLY CONFIDENTIAL

Had Novozymes charged [REDACTED] per pound consistent with U.S. Water's supply agreements (and less than the average [REDACTED] per pound price in 2011) while paying an \$8.00 per pound royalty, its costs would have increased from approximately [REDACTED] to [REDACTED] per pound. At that price and cost point, Novozymes would have earned the same [REDACTED] per pound profit (less [REDACTED]) it was earning as of the hypothetical negotiation date. That profit rate approximates [REDACTED]. While Novozymes has not provided financial statements, I note that the [REDACTED] [REDACTED].¹⁸⁸ Alternatively, Novozymes could have sold at lower prices thereby reducing its profits per pound or resulting in Phytaflow losses in order to support its other products such as [REDACTED].

Applying the \$8.00 per pound royalty rate to the allegedly infringing sales beginning April 9, 2013 through December 31, 2014 results in reasonable royalty damages of approximately [REDACTED].¹⁸⁹

I have also been asked to consider an alternative hypothetical negotiation, for just the '399 patent, issued on December 17, 2013. In such an event, the hypothetical negotiation would have been on approximately December 17, 2013. **Table 5** below compares the four income approach quantitative factors as of April 9, 2013 and December 17, 2013.

Table 5: Income approach quantitative factors

	'137 Patent	'399 Patent
	Jan 1 - Apr 8, 2013	Jan 1 - Dec 16, 2013
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

The same primary factors and issues addressed above would apply in both hypothetical negotiation scenarios. The quantitative figures are also comparable. It is my opinion that in the later hypothetical negotiation, the reasonable royalty rate would also be \$8 per pound. Applying

¹⁸⁸ Schedule 7.1.

¹⁸⁹ Schedule 1.0.

HIGHLY CONFIDENTIAL

the \$8 per pound royalty rate to the allegedly infringing sales beginning December 17, 2013 through December 31, 2014 results in at least reasonable royalty damages of approximately [REDACTED]

[REDACTED]¹⁹⁰.

VII. Conclusion

My opinions and analyses contained herein are based upon information that is presently known to me. As additional information is made available, I may update my opinions and analyses accordingly. At this point, I have quantified damages through December 31, 2014. I may be asked to provide updated calculations or interest calculations as appropriate, and I will update damages upon receipt of additional allegedly infringing sales or additional relevant information accordingly. Also, to the extent that I am asked to provide a post-judgment royalty analysis, I will do so accordingly. I also note that these damages included in my analysis do not contain any potential residual ongoing future damages resulting Novozymes' alleged infringement with its significantly lower prices.

Respectfully submitted,



Richard F. Bero, CPA, CVA
April 1, 2015

¹⁹⁰ Schedule 1.0.

Data and Other Information Considered - as of April 1, 2015

Attachment 1

LEGAL FILINGS:

First Amended Complaint dated February 20, 2014
Memorandum in Support of Novozymes' Motion to Dismiss for Failure to State a Claim Upon Which Relief Can Be Granted and to Stay Discovery dated February 26, 2014
Preliminary Pretrial Conference Order dated March 4, 2014
Plaintiffs' Opposition to Defendants' Motion to Dismiss for Failure to State a Claim Upon Which Relief Can Be Granted and Opposition to Defendants' Motion to Stay Discovery dated March 19, 2014
Reply Memorandum in Support of Novozymes' Motion to Dismiss for Failure to State a Claim Upon Which Relief Can Be Granted and to Stay Discovery dated March 31, 2014
Opinion and Order dated June 11, 2014
Plaintiffs' Answer to Defendants' Counterclaims to Plaintiffs' First Amended Complaint dated July 16, 2014
Stipulated Protective Order dated July 24, 2014
Exhibit A signed by Richard Bero dated November 19, 2014
Defendants Novozymes A/S and Novozymes North America, Inc.'s Amended Answer and Counterclaims to U.S. Water Services, Inc. and Roy Johnson's First Amended Complaint dated November 10, 2014
Defendants Novozymes A/S and Novozymes North America, Inc.'s Amended Answer and Counterclaims to U.S. Water Services, Inc. and Roy Johnson's First Amended Complaint dated November 14, 2014
Plaintiffs' Answer to Defendants' Amended Answer and Counterclaims to Plaintiffs' First Amended Complaint dated December 1, 2014

INTERROGATORIES:

Objections and Responses to Novozymes' Third Set of Interrogatories (No. 17)) to U.S Water Services, Inc. dated November 3, 2014
Second Supplemental and Amended Objections and Responses to Novozymes' Second Set of Interrogatories (nos. 15-16) to U.S Water Services, Inc. dated November 14, 2014
Fourth Supplemental Objections and Responses to Novozymes' First Set of Interrogatories (Nos. 1-14) to U.S Water Services, Inc. dated November 18, 2014
Novozymes' Third Supplemental Responses to Plaintiffs First Set of Interrogatories dated November 14, 2014
Novozymes' First Supplemental Responses to Plaintiffs Second Set of Interrogatories (Nos. 12-15) dated November 14, 2014
Novozymes' First Supplemental Responses to Plaintiffs Third Set of Interrogatories (Nos. 16-18) dated November 14, 2014
Novozymes' First Supplemental Responses to Plaintiffs Fourth Set of Interrogatories (Nos. 19-21) dated November 14, 2014

U.S. PATENTS AT ISSUE:

United States Patent - Patent No. US 8,415,137 B2 - Preventing Phytate Salt Deposition in Polar Solvent System issued on April 9, 2013
United States Patent - Patent No. US 8,609,399 - Reducing Insoluble Deposit Formation in Ethanol Production issued on December 17, 2013

EXPERT REPORTS:

Expert Report of Scott D. Kohl Regarding Invalidity of the Patents-In-Suit dated November 18, 2014
Expert Report of Eric Dorn Regarding Infringement dated November 18, 2014
Corrected Expert Report of Rodney Simms Regarding Validity dated December 18, 2014

Data and Other Information Considered - as of April 1, 2015

Attachment 1

DEPOSITIONS:

Deposition of Michael Chisam dated September 20, 2014 with Exhibits 1-10
Deposition of Thane Combs dated September 20, 2014 with Exhibits 1-23 and Novozymes 1000-1004
Deposition of Donna MacSwain-Santos dated September 24, 2014 with Exhibits 1-11
Deposition of Larry Camden Fowler II dated September 30, 2014 with Exhibits 1-12
Deposition of Dustin Reynolds dated October 1, 2014 with Exhibit 1-10 and Novozymes 1004-1005
Deposition of Sam Sacco dated October 1, 2014
Deposition of Mark T. Skoog dated October 7, 2014 with Exhibits 1006 - 1023
Deposition of Nathan Anderson dated October 10, 2014 with Exhibits 1-15
Deposition of Lyle Schlyer dated October 10, 2014 with Exhibits 1-15 and Novozymes 1024-1029
Deposition of William Whitlock dated October 10, 2014 with Exhibits 1-6
Deposition of Jarrett Hollis dated October 14, 2014 with Exhibits 1-19
Deposition of Rogerio Thuchschmid Nadler Prata dated October 14, 2014 with Exhibits 1-12
Deposition of Ramsena Dadesho dated October 14, 2014 with Exhibits 20-25
30 (b)(6) Deposition of Jack Carlson Rogers dated October 16, 2014 with Exhibits 1-38
Deposition of Leon Gerry dated October 20, 2014 with Exhibits 1-13 and Novozymes 1030
Deposition of Paul R. Young dated November 6, 2014 with Exhibits 1031-1049 and 1092-1110
Deposition of Sonny Ferman Volume I and II dated November 13, 2014 with Exhibits 1-39
Deposition of Roy A. Johnson dated November 18, 2014 with Exhibits 1050 - 1058
Deposition of Monty J. McCoy dated December 11, 2014
Deposition of Dennis Pasko (Rough Draft) dated March 24, 2015 with Exhibits
Deposition of Todd Emslander (Rough Draft) dated March 26, 2015 with Exhibits 1043-1221

DISCUSSIONS:

Al Bly, CEO
Todd Emslander, Director of Sales of Ethanol Process Technologies ("EPT")
Roy Johnson, Chief Innovation Officer and one of the inventors of the Patents-In-Suit;
Monty McCoy, Director of Technology
Rachel Nelson, Senior Financial Analyst
Dennis Pasko, Vice President of EPT

U.S. WATER SERVICES DOCUMENTS WITH BATES STAMPS:

USW-N00000176
USW-N00049963 - 00049974
USW-N00005552 - 00005566
USW-N00005568 - 00005579

Data and Other Information Considered - as of April 1, 2015

Attachment 1

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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Data and Other Information Considered - as of April 1, 2015

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NZ-USW00027915
NZ-USW00027915 – 00027916
NZ-USW00027917 - 00027919
NZ-USW00027921 - 00027923

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Data and Other Information Considered - as of April 1, 2015

Attachment 1

NZ-USW00027926
NZ-USW00027928
NZ-USW00027930 - 00027931
NZ-USW00027939
NZ-USW00027942
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NZ-USW00028047
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NZ-USW00028064
NZ-USW00028067
NZ-USW00028069
NZ-USW00028072

Data and Other Information Considered - as of April 1, 2015

Attachment 1

NZ-USW00028074
NZ-USW00028077 - 00028078
NZ-USW00028080
NZ-USW00028090 - 00028092
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Data and Other Information Considered - as of April 1, 2015

Attachment 1

NZ-USW00028252
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NZ-USW00028464
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Data and Other Information Considered - as of April 1, 2015

Attachment 1

NZ-USW00028481
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NZ-USW00028604
NZ-USW00028609
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Data and Other Information Considered - as of April 1, 2015

Attachment 1

NZ-USW00028656
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NZ-USW00028686
NZ-USW00028689
NZ-USW00028692 - 00028693
NZ-USW00028700
NZ-USW00028705
NZ-USW00028713
NZ-USW00028715
NZ-USW00028715 – 00028727
NZ-USW00028728
NZ-USW00028737

OTHER BATES DOCUMENTS:

GLEW000020 - 000066

DOCUMENTS WITHOUT BATES STAMPS:

Allele Press Release Announcing Acquisition of U.S. Water Services, Inc.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Phytase Sales 3.17.15
EPT Financials-Values

Data and Other Information Considered - as of April 1, 2015

Attachment 1

EPT Financial by Product - Values.xlsx

EPT Expense Breakout.xlsx

INDEPENDENT RESEARCH:

WEBSITES:

<http://www.novozymes.com/en/solutions/bioenergy/starch-based-ethanol/viscosity-reduction/Phytaflow/Pages/default.aspx>

<https://web.archive.org/web/20130829121000/http://novozymes.com/en/solutions/bioenergy/starch-based-ethanol/viscosity-reduction/Phytaflow/Pages/default.aspx>

<https://web.archive.org/web/20140612181634/http://novozymes.com/en/solutions/bioenergy/starch-based-ethanol/viscosity-reduction/Phytaflow/Documents/2013-06976-01-Phytaflow.pdf>

<http://report2012.novozymes.com/service/download-report/the-novozymes-report-2012.pdf>

EXISTING CASE LAW:

Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 507 (1964)

Georgia-Pacific Corp. v. U.S. Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970)

Fromson v. Western Litho Plate & Supp. Co., 853 F.2d 1568, 1575 (Fed. Cir. 1988)

Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1545 (Fed. Cir. 1995)

Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1324-1325, 1333-1334 (Fed. Cir. 2009)

LaserDynamics, Inc. v. Quanta Computer, Inc., 694 F.3d 51 (Fed. Cir. 2012)

Ericsson, Inc., v. D-Link Systems, Inc. (Fed. Cir. 2014)

OTHER:

35 U.S.C. § 284 (1994)

Compensatory Damage Issues in Patent Infringement Cases: A Handbook for Federal District Court Judges 3, Jan. 2010

Any additional documents, websites or other information referenced throughout this report.

ATTACHMENT 2



RICHARD F. BERO, CPA, CVA

N16 W23217 Stone Ridge Drive, Suite 250, Waukesha, WI 53188

Phone – (262) 522-7922 Fax – (262) 522-7938

rbero@berogroup.com

PROFESSIONAL EXPERIENCE:

The BERO Group / Corporate Financial Advisors, LLC

Managing Director

Waukesha, Wisconsin

December 1995-Present

Mr. Bero founded Corporate Financial Advisors in 1995 and served as Managing Director. The BERO Group evolved from Corporate Financial Advisors and Mr. Bero serves as Managing Director. Mr. Bero provides financial and accounting consulting services and expert testimony pertaining to valuation issues and financial damages issues.

Coopers & Lybrand

Manager – Litigation & Claims Services

Milwaukee, Wisconsin

1994-1995

Mr. Bero was the Manager and Practice Leader of the Coopers & Lybrand Milwaukee Litigation & Claims Services practice.

Peterson Consulting Limited Partnership

Executive Consultant

Milwaukee, Wisconsin

1989-1994

Chicago, Illinois

1987-1989

Mr. Bero provided litigation and business dispute support services to trial attorneys and corporate counsel.

EDUCATION:

University of Wisconsin–Madison

Bachelor of Business Administration

Accounting and Finance

1986

ACTIVITIES/OTHER:

Intellectual Property Valuation Instructor – National Association of Certified Valuation Analysts

Licensing Executives Society – Co-Chair Wisconsin Chapter – 2006-2008

Intellectual Property Owners Association – Damages Committee Member – 2004-present

National Association of Certified Valuation Analysts, CVA

Wisconsin Institute of Certified Public Accountants:

Board of Directors – 2000-2002

Chairman CPA's In Industry – Committee 1997-1999

Outstanding Committee Chairperson Award – 1997-1998

American Institute of Certified Public Accountants

Becker CPA Review – Instructor 1995-1998

Illinois Certified Public Accountant Society

PRESENTATIONS:

April 2014	Michigan Intellectual Property Law Association Hot Topics in Patent Damages Troy, Michigan
May 2013	Hot Topics in Patent Royalty Damages Business Valuation Resources Online Symposium on Economic Damages: Part 3 Chicago, Illinois
September 2011	WestLegalEdcenter Webinar Recent Patent Damages Decisions – What is the Effect
August 2011	WestLegalEdcenter Webinar Constructing Royalty Rate Damages
January 2011	The Evolution of the Entire Market Value Rule Business Valuation Resources Webinar Series on Advanced Topics in Lost Profits Damages Chicago, Illinois
September 2010	Patent Damages: Managing the Risks and Contingent Costs Business Valuation Resources / Morningstar Summit on Best Practices in Valuing Intellectual Property Chicago, Illinois
March 2010	Tianjin Bar Association Damage Analysis Techniques and Considerations in U.S. Patent Litigations Tianjin, China

March 2010	Beijing Lawyers Association Damage Analysis Techniques and Considerations in U.S. Patent Litigations Beijing, China
December 2009	Milwaukee Bar Association Constructing Royalty Rate Damages Milwaukee, Wisconsin
October 2009	Michigan Intellectual Property Law Association Constructing Royalty Rate Damages Detroit, Michigan
June 2009	Licensing Executive Society – Chicago Chapter Constructing Royalty Rates Chicago, Illinois
March 2009	Milwaukee Bar Association Patent Infringement Damages – Working Effectively With Your Damages Expert Milwaukee, Wisconsin
January 2009	Wisconsin Intellectual Property Law Association Constructing Royalty Rates Milwaukee, Wisconsin
November 2008	Licensing Executive Society – Minnesota Chapter Constructing Royalty Rates Minneapolis, Minnesota
October 2008	American Intellectual Property Law Association – Annual Meeting Constructing Royalty Rates Washington, D.C.
October 2008	Minnesota Intellectual Property Law Association Constructing Royalty Rates Minneapolis, Minnesota
June 2008	Presentation to Judges and IP attorneys in China The Development of Patent Damages Shenzhen, China
May 2008	Licensing Executive Society International – Spring Conference Avoiding Intellectual Property Hurdles in the U.S. - The View from China Roundtable Moderator Chicago, Illinois
March 2008	Marquette Law School Royalty Damages in Patent Litigation Guest Instructor – IP Litigation Class Milwaukee, Wisconsin

October 2007	Guarding the Treasure: IP Valuation & Remedies Panelist Sponsored by Foley & Lardner New York, New York
October 2007	Shanghai Bar Association Patent Litigation & Valuation – Real World Examples in the U.S. Shanghai, China
October 2007	Shenzhen Society of Certified Public Appraisers Intellectual Property, Valuation and Damages Analysis – Real World Examples in the U.S. Shenzhen, China
May 2007	Shanghai Intellectual Property Service Center Intellectual Property in the U.S.: Opportunities, Valuation & Litigation Shanghai, China
May 2007	Shenzhen Bar Association Managing and Understanding the Value of IP – Real World Examples in the U.S. Shenzhen, China
October 2006	China Hi-Tech Fair 2006 Protection of Chinese Intellectual Property in the U.S. Patent Damages & Ways to Avoid Infringement Shenzhen, China
August 2006	Nanshan Sub-Bureau of Intellectual Property Administration Intellectual Property Value Issues in the United States an Overview for Chinese Businesses Shenzhen, China
March 2006	Milwaukee Bar Association Hindsight is 20/20: Developing & Presenting Damages in Intellectual Property Litigation and Complex Litigation Milwaukee, Wisconsin
December 2005	Wisconsin Intellectual Property Law Association Intellectual Property Damages Update & Discussion Pewaukee, Wisconsin
October 2005	Licensing Executives Society – Annual Meeting Facilitator: Advanced Practices Working Session III: To Sue or Not? How to Decide Phoenix, Arizona
September 2005	Digital Fabrication 2005 Seminar Panel Discussion: Intellectual Property Baltimore, Maryland

September 2005	Intellectual Property Owner's Annual Meeting Patent Infringement Damages Update and Discussion Seattle, Washington
April 2005	Licensing Executives Society – Wisconsin Chapter What's Reasonable: Royalty Damages in Patent Litigation Fond Du Lac, Wisconsin

EXPERT WITNESS TESTIMONY – LAST FOUR YEARS:

Ameritox, Ltd. and Marshfield Clinic v. Millennium Health, LLC
United States District Court – Western District of Wisconsin
February 2015 (Deposition Testimony)

Henryk Oleksy v. General Electric Company
United States District Court – Northern District of Illinois
October 2014 (Deposition Testimony)

Minitab, Inc. v. EngineRoom, LLC
United States District Court – Middle District of Pennsylvania
October 2014 (Deposition Testimony)

Cognex Corp., and Cognex Technology & Investment, LLC v. Microscan Systems, Inc., and The Code Corporation
United States District Court - Southern District of New York
April 2014 (Trial Testimony)
September 2013 (Deposition Testimony)

Douglas Dynamics v. Buyers Products Company
United States District Court - Western District of Wisconsin
April 2014 (Trial Testimony)
October 2010 (Trial Testimony)
September 2010 (Deposition Testimony)

Cheese Systems, Inc. v. Tetra Pak Cheese and Powder Systems, Inc., et al.
United States District Court – Western District of Wisconsin
February 2014 (Deposition Testimony)

Split Pivot, Inc. v. Trek Bicycle Corporation
United States District Court – Western District of Wisconsin
December 2013 (Deposition Testimony)

In Re Innovatio IP Ventures, LLC, Patent Litigation
United States District Court - Northern District of Illinois
September 2013 (Trial Testimony)
September 2013 (Deposition Testimony)

Sloan Valve Company v. Zurn Industries, Inc. and Zurn Industries, LLC
United States District Court - Northern District of Illinois
March 2013 (Deposition Testimony)

Nordock, Inc. v. Systems, Inc.

United States District Court - Eastern District of Wisconsin

March 2013 (Trial Testimony)

January 2013 (Deposition Testimony)

August 2012 (Deposition Testimony)

ABT Systems, LLC, et al. v. Emerson Electric Co.

United States District Court - Eastern District of Missouri

February 2013 (Trial Testimony)

July 2012 (Deposition Testimony)

Illumination Management Solutions, Inc. v. Ruud Lighting, Inc.

United State District Court - Eastern District of Wisconsin

October 2012 (Deposition Testimony)

Rockwell Automation, Inc. et al. v. WAGO Corporation, et al.

United State District Court - Western District of Wisconsin

October 2012 (Trial Testimony)

August 2012 (Deposition Testimony)

Raymond Caluori v. One World Technologies, Inc.

United States District Court - Central District of California

June 2012 (Trial Testimony)

January 2012 (Deposition Testimony)

Michael Foods, Inc. v. National Pasteurized Eggs, Inc.

United States District Court - Western District of Wisconsin

June 2012 (Trial Testimony)

April 2012 (Deposition Testimony)

*Thermal Design, Inc. v. American Society of Heating,
Refrigerating, and Air Conditioning Engineers, Inc.*

United States District Court - Eastern District of Wisconsin

May 2012 (Deposition Testimony)

*Wausau Homes Incorporated v. Everest Builders of Minocqua,
Inc.*

United States District Court - Western District of Wisconsin

April 2012 (Deposition Testimony)

Quad/Graphics, Inc. v. One2One Communications, LLC, et al.

United States District Court - Eastern District of Wisconsin

December 2011 (Trial Testimony)

Thermal Design, Inc. v. Guardian Building Products, Inc., et al.

United States District Court - Eastern District of Wisconsin

December 2011 (Deposition Testimony)

Thilmany, LLC v. Appleton Papers Inc.

Wisconsin Circuit Court - Outagamie County

February 2011 (Deposition Testimony)

PUBLICATIONS:

The Comprehensive Guide to Lost Profits and Other Commercial Damages, “Patent Infringement Damages: Lost Profits and Royalties” (Chapter 25, 2014 3rd ed., BVR Publications)

April 2011 – CCH Business Valuation Alert, “The *Uniloc* Case: 25 Percent Rule of Thumb Rejected”

The Comprehensive Guide to Lost Profits, “Lost Profits Damages in Patent Infringement Lawsuits” (Chapter 19, 2011 ed., BVR Publications)

August 2009 – IP Law360 – “Demand for the Patented Product – Lower Bar?”

The Comprehensive Guide to Lost Profits, “Lost Profits Damages in Patent Infringement Lawsuits” (Chapter 12, 2009 ed., BVR Publications)

October 2008 – AIPLA White Paper – “Constructing Royalty Rates”

February 2008 – IP Law360 – “IP Litigation in China and the U.S.”

Global Intellectual Property Asset Management Report, “Intellectual Property Metrics Today: It Can Be Done” (June 2005 and July 2005)

Proving and Pricing Construction Claims, “Claims for Lost Profit” (Chapter 14, 2nd ed., 1996, Wiley Law Publications)

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Summary of Royalty Damages

Schedule 1.0

	[1]	[2]	[3]	[4]	[4]	[4]	[4]
	April 9, 2013 - Dec. 31, 2014	Dec. 17, 2013 - Dec. 31, 2014	Dec. 17, 2013 - Dec. 31, 2014	April 9, 2013 - Dec. 31, 2014	April 9, 2013 - Dec. 31, 2014	Dec. 17, 2013 - Dec. 31, 2014	April 9, 2013 - Dec. 31, 2014
	'137 Claims	'399 Claims reciting a pH limitation	'399 Claims not reciting a pH limitation	'137 Claims & '399 Claims reciting a pH limitation	'137 Claims & '399 Claims not reciting a pH limitation	'399 Claims reciting a pH limitation & '399 Claims not reciting a pH limitation	'137 Claims, '399 Claims reciting a pH limitation & '399 Claims not reciting a pH limitation
Phytaflow Pounds (lbs.)							
[A] Ethanol plants with Reduced Pressure / Vacuum or Atmospheric distillation	██████████	██████████	██████████	██████████	██████████	██████████	██████████
[A] Ethanol plants with Pressure distillation	██	██	████	██	████	████	████
Total	██████████	██████████	██████████	██████████	██████████	██████████	██████████
[B] Royalty rate	██	██	██	██	██	██	██
[C] Royalty damages	██████████	██████████	██████████	██████████	██████████	██████████	██████████

NOTES / SOURCES:

Note: The asserted claims of the '399 patent that recite a pH limitation are claims 2, 16-22 and 35.

Note: The asserted claims of the '399 patent that do not recite a pH limitation are claims 1, 5-12, 25, 28-32 and 34.

[1] Schedule 1.1.

[2] Schedule 1.2

[3] Schedule 1.3.

[4] All potential double - counting of pounds has been taken into consideration and accounted for.

[A] Schedules 1.1, 1.2 & 1.3.

[B] Per the Bero Report.

[C] = [A] * [B].

Novozymes Phytaflow pounds subject to '137 claims Schedule 1.1

Novozymes Phytaflow pounds subject to '137 claims Schedule 1.1

[A] Total			
[B] Infringing Phytaflow pounds			
Phytaflow pounds subject to '137 patent claims as a %'s of Infringing Phytaflow pounds			
[C] Royalty rate	\$8	\$8	\$8
[D] Royalty damages			

Novozymes Phytaflow pounds subject to '137 claims

Schedule 1.1

	2013	2014	Total
	Apr. 9 - Dec. 31		

NOTES / SOURCES:

[A] Summarized per NZ-USW00026289_HIGHLY_CONFIDENTIAL.xlsx. April 2013 is calculated based on 23 / 30 days.
I am instructed that these plants are to be included under the '137 patent claims.

[B] Schedule 5.0.

[C] Per the Bero Report.

[D] = [A] x [C].

**Novozymes Phytaflow pounds subject to '399 claims
reciting a pH limitation
Schedule 1.2**

[illegible]

Novozymes Phytaflow pounds subject to '399 claims reciting a pH limitation

Schedule 1.2

[A] Total				
[B] Infringing Phytaflow pounds				
Phytaflow pounds subject to '399 patent claims reciting				
a pH limitation as a %'s of Infringing Phytaflow pounds				
[C] Royalty rate				
[D] Royalty damages				

Novozymes Phytaflow pounds subject to '399 claims reciting a pH limitation

Schedule 1.2

	2013	2014	Total
	Dec. 17 - Dec. 31		

NOTES / SOURCES:

- [A] Summarized per NZ-USW00026289_HIGHLY_CONFIDENTIAL.xlsx. December 2013 is calculated based on 15 / 30 days.
I am instructed that these plants are to be included under the '399 patent claims reciting a limitation relating to the pH of the ethanol processing fluid in the beer column being 4.5 or higher.
- [B] Schedule 5.1.
- [C] Per the Bero Report.
- [D] = [A] x [C].

**Novozymes Phytaflow pounds subject to '399 claims
not reciting a pH limitation
Schedule 1.3**

[illegible]

Novozymes Phytaflow pounds subject to '399 claims not reciting a pH limitation

[A] Total	██████████	██████████	██████████
[B] Infringing Phytaflow pounds	██████████	██████████	██████████
Phytaflow pounds subject to '399 patent claims not reciting a pH limitation as a %'s of Infringing Phytaflow pounds	██████████	██████████	██████████
[C] Royalty rate	\$8	\$8	\$
[D] Royalty damages	██████████	██████████	██████████

Novozymes Phytaflow pounds subject to '399 claims not reciting a pH limitation Schedule 1.3

	2013	2014	Total
	Dec. 17 - Dec. 31		

NOTES / SOURCES:

- [A] Summarized per NZ-USW00026289_HIGHLY_CONFIDENTIAL.xlsx. December 2013 is calculated based on 15 / 30 days.
I am instructed that these plants are to be included under the '399 patent claims not reciting a limitation relating to the pH of the ethanol processing fluid in the beer column being 4.5 or higher.
- [B] Schedule 5.1.
- [C] Per the Bero Report.
- [D] = [A] x [C].

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Summary of income approach

Schedule 2.0

	2011	2012	2013			2014
			Jan 1 - Apr 8	Jan 1 - Dec 16	Sub-total	
[A] pHytOUT incremental profit per lb.	████	████	████	████	████	████
[B] pHytOUT pricing premium per lb. - over Novozymes price	████	████	████	████	████	████
pHytOUT pricing premium per lb. - over EPT products						
[C] other EPT products, collectively, gross profit rate	████	████	████	████	████	████
[D] next highest EPT product gross profit rate	████	████	████	████	████	████
[E] Phytaflow profit per lb.	████	████	████	████	████	████

NOTES / SOURCES:

Note: Any minor differences are due to rounding.

[A] Per Schedules 6.0 & 6.1.

[B] Per Schedule 3.0.

[C] Per Schedule 4.0.

[D] Per Schedule 4.1.

[E] Per Schedules 5.0 & 5.1.

pHytOUT pricing premium (over Novozymes price)

Schedule 3.0

	2011	2012	2013			2014	Total
			Jan 1 - Apr 8	Jan 1 - Dec 16	Sub-total		
[A] U.S. Water pHytOUT ASP per lb.	████	████	████	████	████	████	████
[B] Novozyme Phytalflow ASP per lb.	████	████	████	████	████	████	████
[C] Difference per lb.	████	████	████	████	████	████	████
[D] Less: Incremental cost %	████	████	████	████	████	████	████
[E] Incremental cost per lb.	████	████	████	████	████	████	████
[F] U.S. Water pHytOUT pricing premium per lb.	████	████	████	████	████	████	████

NOTES / SOURCES:

Note: Any minor differences are due to rounding.

[A] Per Schedules 6.1 & 6.2.

[B] Per Schedules 5.1 & 5.2.

[C] = [A] - [B]

[D] Per Schedule 7.2. Note that the pricing difference would not result in incremental travel costs, however, they are relatively minimal and are included herein as incremental costs.

[E] = [C] * [D]

[F] = [C] - [E]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]						[REDACTED]
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[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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[REDACTED]
[REDACTED]
[REDACTED]

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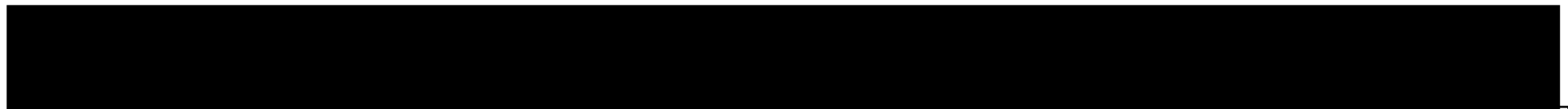
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Government	Percentage
Current government	85%
Previous government	15%

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Age Group	Percentage
18-24	15%
25-34	35%
35-44	25%
45-54	45%
55-64	30%
65+	10%

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Government	Percentage
Current government	85%
Previous government	15%

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Age Group	Percentage
18-24	30%
25-34	35%
35-44	25%
45-54	10%
55-64	5%
65+	2%

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Age Group	Percentage
18-24	10%
25-34	25%
35-44	75%
45-54	55%
55-64	20%
65-74	15%
75-84	10%
85-94	5%
95-104	5%
105-114	10%
115-124	5%
125-134	5%
135-144	5%
145-154	5%
155-164	5%
165-174	5%
175-184	5%
185-194	5%
195-204	5%
205-214	5%
215-224	5%
225-234	5%
235-244	5%
245-254	5%
255-264	5%
265-274	5%
275-284	5%
285-294	5%
295-304	5%
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365-374	5%
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385-394	5%
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635-644	5%
645-654	5%
655-664	5%
665-674	5%
675-684	5%
685-694	5%
695-704	5%
705-714	5%
715-724	5%
725-734	5%
735-744	5%
745-754	5%
755-764	5%
765-774	5%
775-784	5%
785-794	5%
795-804	5%
805-814	5%
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1015-1024	5%
1025-1034	5%
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1055-1064	5%
1065-1074	5%
1075-1084	5%
1085-1094	5%
1095-1104	5%
1105-1114	5%
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1. Introduction

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The diagram consists of a grid of black and white squares. The header section at the top contains a row of black squares, and the footer section at the bottom contains a row of black squares. The grid is divided into several columns and rows, with some cells containing black squares and others being white. The grid is labeled with 'a' through 'z' in the header and '1' through '26' in the footer.

The diagram illustrates a sequence of operations on a 10x10 grid. The grid is divided into three main horizontal sections. The top section shows a sequence of operations on a 10x10 grid, with the first row of the grid being the only one that is non-zero. The middle section shows a sequence of operations on a 10x10 grid, with the first row of the grid being the only one that is non-zero. The bottom section shows a sequence of operations on a 10x10 grid, with the first row of the grid being the only one that is non-zero. The diagram is labeled with '10x10' and '10x10'.

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USW pHytOUT & Novozymes Phytaflow pounds by year

Schedule 9.0

	2009	2010	2011	2012	2013	2014	Total
[A] Novozymes Phytaflow pounds							
[B] U.S. Water pHytOUT pounds							
[C] Total pounds							
%s							
[D] Novozymes							
[D] U.S. Water							
[D] Total							

NOTES / SOURCES:

Note: Any minor differences are due to rounding.

[A] Per Schedule 5.0.

[B] Per Schedule 6.0.

[C] = [A] + [B].

[D] Calculated based on amounts herein.

U.S. Water customers converted after '137 patent issuance

Schedule 10.0

 									
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Category	Item	Value
Category 1	Item 1	10
	Item 2	20
	Item 3	30
Category 2	Item 1	40
	Item 2	50
	Item 3	60
Category 3	Item 1	70
	Item 2	80
	Item 3	90

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U.S. Water customers converted after '137 patent issuance

Schedule 10.0

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U.S. Water customers that converted prior to '137 patent issuance
Schedule 10.1

[illegible]

U.S. Water customers that converted prior to '137 patent issuance

Schedule 10.1

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1	1	2	3	4	5	6	7	8	9	10
2	1	2	3	4	5	6	7	8	9	10
3	1	2	3	4	5	6	7	8	9	10
4	1	2	3	4	5	6	7	8	9	10
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7	1	2	3	4	5	6	7	8	9	10
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9	1	2	3	4	5	6	7	8	9	10
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31	1	2	3	4	5	6	7	8	9	10
32	1	2	3	4	5	6	7	8	9	10
33	1	2	3	4	5	6	7	8	9	10
34	1	2	3	4	5	6	7	8	9	10
35	1	2	3	4	5	6	7	8	9	10
36	1	2	3	4	5	6	7	8	9	10
37	1	2	3	4	5	6	7	8	9	10
38	1	2	3	4	5	6	7	8	9	10
39	1	2	3	4	5	6	7	8	9	10
40	1	2	3	4	5	6	7	8	9	10
41	1	2	3	4	5	6	7	8	9	10
42	1	2	3	4	5	6	7	8	9	10
43	1	2	3	4	5	6	7	8	9	10
44	1	2	3	4	5	6	7	8	9	10
45	1	2	3	4	5	6	7	8	9	10
46	1	2	3	4	5	6	7	8	9	10
47	1	2	3	4	5	6	7	8	9	10
48	1	2	3	4	5	6	7	8	9	10
49	1	2	3	4	5	6	7	8	9	10
50	1	2	3	4	5	6	7	8	9	10

NOTES / SOURCES:

[A] Schedule 6.5.

[B] Schedule 5.4.